

Human beta-nerve growth factor gene sequence highly homologous to that of mouse.

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Nerve growth factor (NGF) is thought to have a profound effect on the development and maintenance of sympathetic and embryonic sensory neurones (see refs 1-3 for review). NGF activity isolated from the male mouse submaxillary gland (MSG) consists of three types of subunits, alpha, beta and gamma, which specifically interact to form a 7S, approximately 130,000-molecular weight (Mr) complex. The 7S complex contains two identical 118-amino acid beta-chains, which are solely responsible for the nerve growth-stimulating activity of NGF. While NGF is found in almost all vertebrates, most research has focused on murine NGF, as the mouse male submaxillary gland contains higher levels of this polypeptide than other tissues. Even so, beta-NGF comprises only approximately 0.1% of the protein in this small gland, which has made the study of this polypeptide difficult. The amino acid sequence of the mouse NGF beta-chain has been determined and some information has been obtained regarding the size of a mouse precursor molecule, pro-beta-NGF, but little was known about the structure and relatedness of beta-NGF from other vertebrates. Here we describe the isolation of mouse beta-NGF complementary DNA (cDNA) and present its nucleotide sequence, which predicts a prepro-beta-NGF molecule of Mr 27,000 (27K) and a pro-beta-NGF molecule of Mr 25K. We have used the mouse beta-NGF cDNA clone to isolate the human beta-NGF gene, the coding regions of which are highly homologous to the mouse prepro-beta-NGF nucleotide and amino acid sequences.

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